STUDIES BY FORECAST OFFICIALS.

HIGH AREAS NORTH OF THE ST. LAWRENCE VALLEY IN OCTOBER, NOVEMBER, AND DECEMBER.

By Prof. E. B. GARRIOTT (dated November, 1893).

The areas of high barometric pressure that appear north of the St. Lawrence River in October, November, and December usually advance to that region from Minnesota or the Dakotas in twenty-four hours. A large proportion of the high areas of this class pass from western Quebec to the Canadian Maritime Provinces in twenty-four hours; a less frequent path, and one that is followed in exceptional cases only in November and December, is from western Quebec southeastward off the middle Atlantic coast. The Saint Lawrence high areas generally show pressure 30.20 to 30.30; as the fall advances, however, higher pressures appear, and values above 30.50 obtain about once a month in November and December.

With the appearance north of the St. Lawrence of a high area in October an area of low pressure usually occupies the Canadian Maritime Provinces, and another the extreme northwest. If a low area is not shown in the Northwest one will appear within twelve hours. Twenty-four hours before the high area reaches the region north of the St. Lawrence River, and when it occupies a position in the Northwest, a temperature fall of 10° or more occurs in the upper Lake Region and the Ohio Valley, and rain falls from the eastern Lake Region over the Atlantic Coast States north of Virginia. Twelve hours before the high area reaches western Quebec, and when it is central over the upper Lake Region, a temperature fall of 10° or more occurs from the lower Lakes over the interiors of New York, Pennsylvania, and New England, and the western limit of the rain area reaches the Middle Atlantic and New England States. Twenty-four hours after the high area appears north of the St. Lawrence the rain area has passed to sea and the temperature has begun to rise over the interior of the Middle Atlantic and New England States. Within thirty-six hours after the appearance of the high area north of the St. Lawrence fine weather with rising temperature obtains over the Middle Atlantic and New England States, and a fall in temperature is noted only over the Canadian Maritime Provinces. When October high areas pass southeastward from the St. Lawrence Valley a marked fall in temperature occurs over the South Atlantic States. When the high area passes eastward over northern New England and the St. Lawrence Valley easterly winds will be attended by cloudy weather and sometimes by rain along the immediate middle Atlantic and south New England coasts.

In November the relative positions and movements of the high areas and their attending low areas are practically the same as noted for the preceding month, and no material difference is shown in the temperature and rain conditions which attend them. In December, however, the greater magnitude of the high areas occasions marked differences in conditions and effects when compared with those noted for the fall months. Twenty-four hours before a December high area appears north of the St. Lawrence, and when it occupies Minnesota or the Dakotas, a low area appears on the north Pacific Coast, rain or snow falls over the lower Lakes, and in 60 per cent of the instances noted a marked fall in temperature occurs over the Middle Atlantic and New England States. Twenty-four hours after the high area appears north of the St. Lawrence (and when it has advanced to Nova Scotia, and the north Pacific Coast low area has advanced to the northwestern Lake Region) rain or snow falls along the middle Atlantic and New England coasts and the temperature continues low over the Atlantic Coast States from Virginia to Maine. Within thirty-six hours after a high area appears north of the St. Lawrence in December fine weather with rising temperature prevails over the middle Atlantic and New England States.

In conclusion, it may be stated that the high areas of the type above referred to average about two per month, or about one-fourth of the high areas traced for the months of October, November, and December. Their appearance north of the St. Lawrence is preceded by rain or snow and falling temperature over the Middle Atlantic and New England States, and is followed within thirty-six hours by fair weather and rising temperature over those districts.

WEATHER FORECASTS IN THE STATE OF MISSOURI.

By H. C. FRANKENFIELD, Local Forecast Official (dated December 4, 1895).

[Extract from complete paper now in press.]

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In compiling the data upon which to base any deductions regarding the successful forecasting of Missouri weather, only the observations and maps for a limited number of years have been used, namely, from July, 1889, to June, 1894, inclusive. It would, of course, have been preferable to have used more, but lack of time prevented, and, in any event, it was thought that the different storm types are so distinct, both as to locality and season, that fairly accurate results could be obtained with but five years' data.

PRECIPITATION.

In all 549 more or less well-defined lows were studied, and of these all but three, or one-half of 1 per cent, originated somewhere to the westward of the State of Missouri. Of these three, two backed in from the south Atlantic Coast sufficiently to cause precipitation, local in one case and general in the other, and comparatively light in both. The other originated within the State. It was only of moderate energy, not very well defined, and caused general thunderstorms with a substantial amount of rain.

By far the greater portion of the lows which moved over the country first appeared in the British Northwest Territory in the Province of Alberta. Twenty-six per cent were of this type, but only 32 per cent of these caused precipitation in the State of Missouri. A considerable number, 9 per cent, moved eastward from the north Pacific Coast, and of these 49 per cent caused precipitation in Missouri. An almost equal number originated in the middle Plateau, but 80 per cent of these caused precipitation. Seven per cent originated in the southern Slope, and 87 per cent of these caused precipitation. Seven per cent also originated in the extreme northwest, east of the Rocky Mountains, but only 49 per cent of these caused precipitation in our State. Six per cent originated in the southern Plateau and 91 per cent of these caused precipitation. Only 2 per cent originated in Mexico or the west Gulf States, but 92 per cent of these caused precipitation. Rain or snow also followed fifty-six cases of irregular and unsettled conditions, indicated on the weather maps by the curving away from each other of the isobars and isotherms, leaving an open space between. These usually caused rain within a reasonable time, and 10 per cent of them developed into well-defined lows, one in April, 1893, becoming a storm of exceptional severity by the time it reached the middle Slope. These irregular arrangements of the isobars and isotherms, when they occur in the Southwest and West, indicate the presence of conditions which will almost invariably cause precipitation in Missouri in from twenty-four to thirty-six hours; the interval depends upon the distance of the irregular conditions from the State when first noticed.